

# PATENT SPECIFICATION

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## (54) FUSIBLE LABEL CONSTRUCTION

(71) We, AVERY PRODUCTS CORPORATION, a corporation organised and existing under the laws of the state of California, United States of America, residing at 415 Huntington Drive, San Marino, California, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to the marking of substrates with heat fusible indicia, the marking applied being permanent or temporary, depending upon the temperature to which the heat fusible indicia is raised.

Attention is directed to our co-pending divisional patent application No. 19989/74 (Serial No. 1376004) the entire disclosure of which is incorporated herein by reference.

It has been known to prepare decalcomania in which some heat fusible visual indicia is carried by an activatable adhesive layer for application to a substrate to be marked. The adhesive is not normally tacky, but is tackified by the application of water, a suitable solvent, or heat. When the adhesive is activated, the decal can be affixed to the substrate. When subsequently heated to some desired temperature, the carrier layer vaporizes with possible attendant burning or decomposition and the indicia fuses to the substrate.

This labelling or marking system possesses several inherent deficiencies. When a solvent is used to activate an adhesive, too often the decal becomes so solvent wet that proper positioning of the decal on the substrate is made most difficult. In addition, there may be formed a solvent interface between the indicia and the substrate which may preclude proper bonding

of the indicia to the substrate.

When the adhesive is heat-activated, time becomes critical, since the decal must be applied to the substrate before the adhesive resets.

Further, no practical system has been devised which permits machine application of the decal to a substrate.

It has now been found that deficiencies attendant to prior art systems for the marking of substrates with a heat fusible indicia may be overcome by providing a label construction in which a pressure-sensitive adhesive serves as a carrier for a heat fusible indicia.

The invention provides a pressure sensitive label assembly which comprises (a) a release liner, (b) a volatilizable pressure sensitive adhesive layer in contact with said release liner, (c) a heat fusible indicia in adhesive contact with said pressure sensitive adhesive layer, (d) a supporting face material having a release mask layer in contact with both the indicia and at least a portion of said volatilizable pressure sensitive adhesive layer the bond strength of said release mask surface to at least the volatilizable pressure sensitive adhesive layer and the fusible indicia exceeding the bond strength of the pressure sensitive adhesive layer to the release liner.

The invention also provides inter alia, a process for assembling a label material containing heat fusible indicia which comprises (a) applying to a release liner a layer of pressure sensitive adhesive, (b) applying a heat fusible indicia onto the pressure sensitive adhesive layer, (c) applying to the pressure sensitive adhesive layer and heat fusible indicia a supporting face material having a release mask layer in contact with the heat fusible indicia and at least a portion of the pressure sensitive adhesive layer, the release mask layer of the face material and fusible indicia having a

greater bond to at least the pressure sensitive adhesive layer in contact with said fusible indicia and release mask layer than the bond of the pressure sensitive adhesive layer to the release liner.

The invention also provides a process of applying an indicia to a workpiece comprising the steps of providing a label assembly according to the invention, removing the release liner therefrom, adhesively securing the indicia to the workpiece via the pressure sensitive adhesive layer, and applying heat to fuse the indicia and thereby bond it to the workpiece.

The invention also provides a workpiece having an indicia bonded thereto by such a process.

There now follows a description, to be read with reference to the accompanying drawing, of an embodiment of the invention. This description is given by way of example of the invention only and not by way of limitation thereof.

In the accompanying drawing the single figure is an illustration of the embodiment in which a fusible indicia is between a release coated face material and a pressure-sensitive layer which, in turn, is in contact with a release liner.

The embodiment shown in the drawing is similar to that shown in Fig. 4 of the divisional Application No. 19989/74 (serial No. 1376004) but in the present embodiment the layer of pressure-sensitive adhesive 14 is used to provide the adhesion of the fusible indicia to the release liner 10.

Suitable applications for the present embodiment include among others, the temporary identification of a substrate using materials which will fuse at a relatively low temperature such as a fusible mixture of powdered aluminium and a silicone and where it is desired to provide bright opaque colors which may, or may not, cover the entire surface of the label.

In this construction, the face material 16 is entirely or partially coated with a mask layer 18, the layer 18 amounting to, for all practical purposes, a release surface between the face material 16, indicia 12 and at least a portion of adhesive layer 14.

The coating on the face material is selected such that the combined adhesive strength of the pressure sensitive adhesive layer and the cohesive strength of the fusible indicia 12 exceeds the bond strength on the pressure-sensitive adhesive layer for release liner 10.

In application, the laminate comprising the face material with its release surface just mentioned, fusible indicia 12 and pressure-sensitive adhesive layer 14 separate first from release liner 10. Upon application to a substrate the face material may

be left in contact with the fusible indicia and pressure-sensitive adhesive layer particularly where the face material is to be consumed during the firing of fusion operation.

Preferably, however, the release surface present is of such a nature that upon application of the label to a substrate, the face material along with its release surface can be removed leaving the fusible indicia exposed and secured to the substrate by the pressure-sensitive adhesive layer.

As an alternative to the general construction illustrated, the release surface can be selected such that once the label has been applied to the substrate the face material will separate from the release surface leaving the release surface, indicia and pressure-sensitive adhesive in contact with the substrate during the firing or fusing operation.

Upon firing, it has been found that the fusible indicia will penetrate the adhesive layer without disruption or distortion and bond to the substrate as the adhesive layer is volatilized or pyrolyzed leaving on the substrate, depending upon the nature of the indicia, a selected identification mark which can be readily removed but which will withstand handling as an identification mark during the construction of television tubes and the like to provide bright opaque colors which are temporarily bonded to the substrate. It will be realised that, e.g. by changing the nature of the indicia, such colors may be permanently bonded to the substrate.

This construction has been found to be useful where it is desired to apply fusible indicia using a silk screen operation during label fabrication and particularly where the indicia is to be, by nature, entirely opaque and bright.

This construction is further amenable to automatic labeling operations wherein the release liner is separated from the label material carrying the adhesive and the fusible indicia and the label indexed or registered onto a substrate; the release coated face material may be, when desired, removed when the substrate is fired.

In such automatic applications the face material with the release surface may be present as a continuous web, or tape, to which the label comprising the laminate of the release liner, pressure-sensitive adhesive and fusible indicia appear as discrete labels with or without a surrounding matrix and can be applied automatically by removing the release liner and pressing the exposed adhesive surface to the substrate to be labeled.

WHAT WE CLAIM IS:—

1. A pressure sensitive label assembly which comprises (a) a release liner, (b) a

volatilizable pressure sensitive adhesive layer in contact with said release liner, (c) a heat fusible indicia in adhesive contact with said pressure sensitive adhesive layer, 5 (d) a supporting face material having a release mask layer in contact with both the indicia and at least a portion of said volatilizable pressure sensitive adhesive layer the bond strength of said release 10 mask surface to at least the volatilizable pressure sensitive adhesive layer and the fusible indicia exceeding the bond strength of the pressure sensitive adhesive layer to the release liner.

15 2. A pressure sensitive label assembly as claimed in claim 1 in which the release mask layer covers the entire surface of the face material in contact with the volatilizable pressure sensitive adhesive 20 layer.

3. A process for assembling a label material containing heat fusible indicia which comprises (a) applying to a release 25 liner a layer of pressure sensitive adhesive, (b) applying a heat fusible indicia onto the pressure sensitive adhesive layer, (c) applying to the pressure sensitive adhesive layer and heat fusible indicia a supporting 30 face material having a release mask layer in contact with the heat fusible indicia and at least a portion of the pressure sensitive adhesive layer, the release mask layer of the face material and fusible indicia having a greater bond to at least the pressure 35 sensitive adhesive layer in contact with said fusible indicia and release mask layer than the bond of the pressure sensitive adhesive layer to the release liner.

4. A process as claimed in claim 3 in 40 which the release mask layer substantially covers the entire surface of the face material in contact with the fusible indicia and pressure sensitive adhesive layer.

5. A process for assembling a label 45 material containing heat fusible indicia which comprises (a) applying to a release liner a layer of pressure sensitive adhesive (b) applying heat fusible indicia to a release mask layer contained on at least a 50 portion of a supporting face material, (c) laminating the surface of the face material carrying the heat fusible indicia to the pressure sensitive adhesive layer such that the bond of the heat fusible indicia and face 55 material to the pressure sensitive adhesive

layer exceeds the bond of the pressure sensitive adhesive layer for the release liner.

6. A process as claimed in claim 5 in which the release mask layer substantially covers the entire surface of the face 60 material in contact with the fusible indicia and pressure sensitive adhesive layer.

7. A process for assembling a label material containing heat fusible indicia which comprises (a) applying a heat fusible 65 indicia to a release mask layer contained on at least a portion of a supporting face material, (b) applying to the face material and heat fusible indicia a layer of pressure sensitive adhesive, (c) applying a release 70 liner to the layer of pressure sensitive adhesive, the adhesion of the release liner to the layer of pressure sensitive being less than the bond of the face material and heat fusible indicia to the pressure sen- 75 sitive adhesive layer.

8. A process as claimed in claim 7 in which the release mask layer substantially covers the entire surface of the face material in contact with the fusible indicia 80 and pressure sensitive adhesive layer.

9. A process of applying an indicia to a workpiece comprising the steps of providing a label assembly according to claim 1 or claim 2, removing the release liner 85 therefrom, adhesively securing the indicia to the workpiece via the pressure sensitive adhesive layer, and applying heat to fuse the indicia and thereby bond it to the workpiece. 90

10. A workpiece having an indicia bonded thereto by a process according to claim 9.

11. A label assembly constructed, arranged and adapted to operate sub- 95 stantially as hereinbefore described with reference to the accompanying drawing.

12. A process for assembling a label assembly substantially as hereinbefore described with reference to the accompanying 100 drawing.

13. A process of applying an indicia to a workpiece substantially as hereinbefore described with reference to the accom- 105 panying drawing.

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